



**Department of
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& Architectural Science

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LAB 2 WORKSHEET

Pre-Lab Questions

1. What are the essential flight and navigation instruments to be equipped for each pilot station?

The list of the most essential flight and navigation instruments includes:

1. Altimeter: Instrument used to measure the altitude of the aircraft
2. Airspeed indicator: Instrument used to indicate the forward velocity of the aircraft.
3. Vertical speed indicator: Instrument indicating the rate of climb.
4. Gyroscopic bank-and-pitch attitude indicator: Indicates aircrafts relative position to the earth's horizon.
5. Gyroscopic rate-of-turn indicator (with bank indicator): Indicates the aircrafts rate of turn.
6. Gyroscopic direction indicator: Indicates aircrafts heading.
7. Magnetic compass: Indicates aircrafts direction relative to the earth's poles.
8. Outside air temperature indicator: Indicates the temperature outside of the aircraft.
9. Clock: Indicates time.

2. The power indicators for an airplane fitted with a constant speed propeller(s) are?

Aircraft equipped with constant speed propellers use Manifold Pressure Gauges to indicate the power output of the engine. The manifold pressure gauge measures the pressure of the fuel/air mixture within the intake of the engine.

3. What are the FAR 25.1321 specifications on the location of the instruments for attitude, airspeed, altitude and direction of flight?

1. The instrument that most effectively indicates attitude must be on the [instrument] panel in the top center position;
2. The instrument that most effectively indicates airspeed must be adjacent to and directly left of the instrument in the top center position;
3. The instrument that most effectively indicates altitude must be adjacent to and directly right of the instrument in the top center position; and
4. The instrument that most effectively indicates direction of the flight must be adjacent to and directly below the instrument in the top center position.

Instrument Panel Design

1. Instrument Panel Design Explanation.



Figure 1: Instrument Panel

We placed the instruments on the panel in a way that groups instruments together by designated functions such as fuel, pressure, velocity, etc. When designing the layout we made sure to follow FAR 25.1321 specifications, placing instruments such as the attitude, airspeed, altitude, and direction indicators in the center of the panel, following FAR ordering regulations. Other instruments such as the temperature gauges are located together to the far left of the panel. The fuel and pressure instruments and indicators are located to the right of the panel, while the engine rpm and torque indicators are located at the bottom of the panel. We placed the instruments grouped together to better communicate information from specific aircraft systems in one location.

References

[1] Chan, C., & Liu, Dr. G. (2024). AER 715 Avionics and Systems Laboratory 1: Introduction to Digital Signal Processing. Login - Toronto Metropolitan University Central Authentication Service.
<https://courses.torontomu.ca/d2l/le/content/910158/viewContent/5832927/View> [Accessed: Sep. 15, 2024].